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Higuchi et al.

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(54) **IMAGING DEVICE AND RECORDING CONTROL SYSTEM**

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(51) **Int. Cl.**

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G11B 27/34	(2006.01)
G11B 27/36	(2006.01)
G11B 31/00	(2006.01)

(Continued)

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CPC ***G11B 27/002*** (2013.01); ***G11B 27/034*** (2013.01); ***G11B 27/34*** (2013.01); ***G11B 27/36*** (2013.01); ***G11B 31/00*** (2013.01); ***H04N 5/765*** (2013.01); *G11B 2220/216* (2013.01); *G11B 2220/218* (2013.01); *G11B 2220/2562* (2013.01); *G11B 2220/2575* (2013.01); *H04N 5/772* (2013.01); *H04N 5/85* (2013.01)

(58) **Field of Classification Search**

USPC 386/45–46, 55, 83, 95–96, 223–229

See application file for complete search history.

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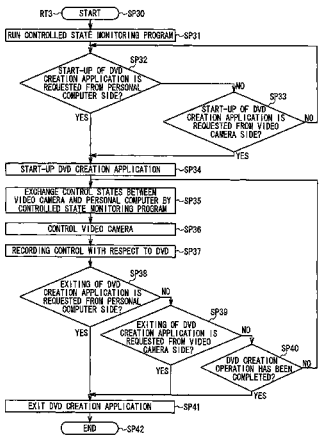
(57) **ABSTRACT**

An imaging device and recording control system in which the usability is improved dramatically. The imaging device is configured to output imaging data that is obtained as a result of imaging of an object, and a recording control system. The imaging device includes a control unit that recognizes a controlled state of an external recording device when a communication is enabled with the recording device through a communication channel that conforms to a predetermined transmission method. An input unit allows the recording device to execute an application needed for a recording operation obtained by controlling the recording device. The recording device records the imaging data obtained through the communication channel when the application is executed.

17 Claims, 11 Drawing Sheets



(51) **Int. Cl.**
H04N 5/765 (2006.01)
H04N 5/85 (2006.01)

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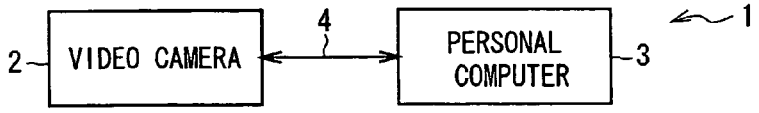


FIG. 1 (PRIOR ART)

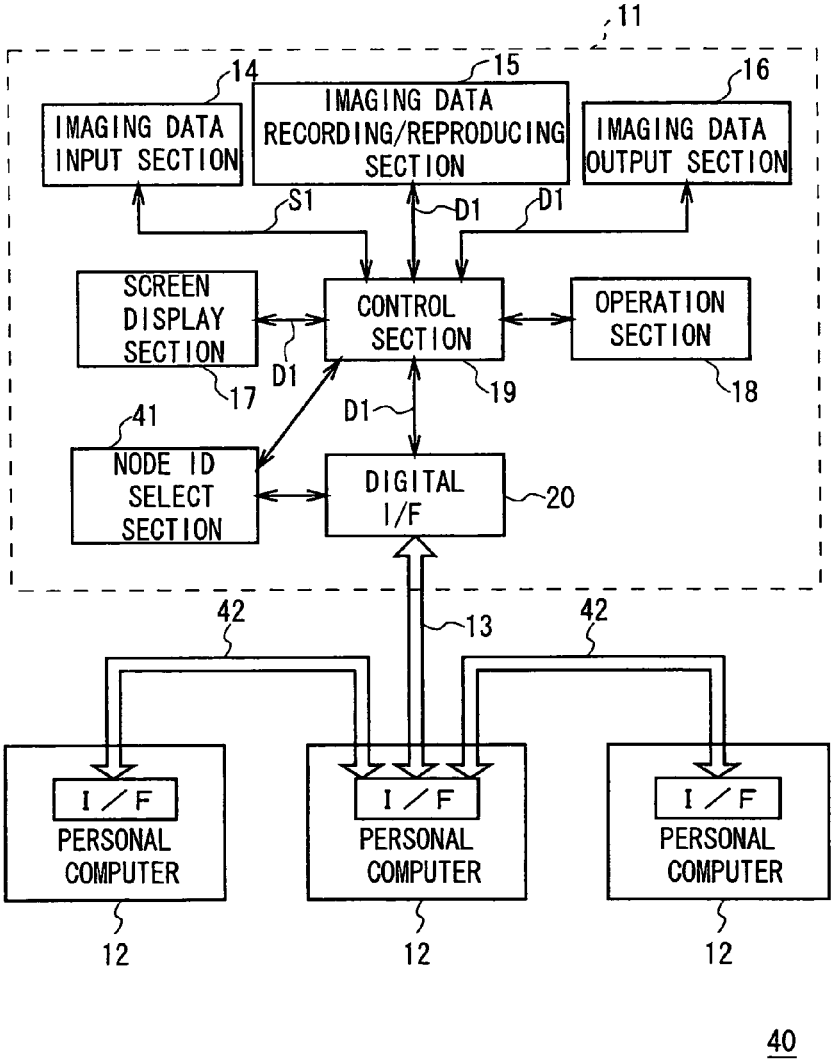


FIG. 12

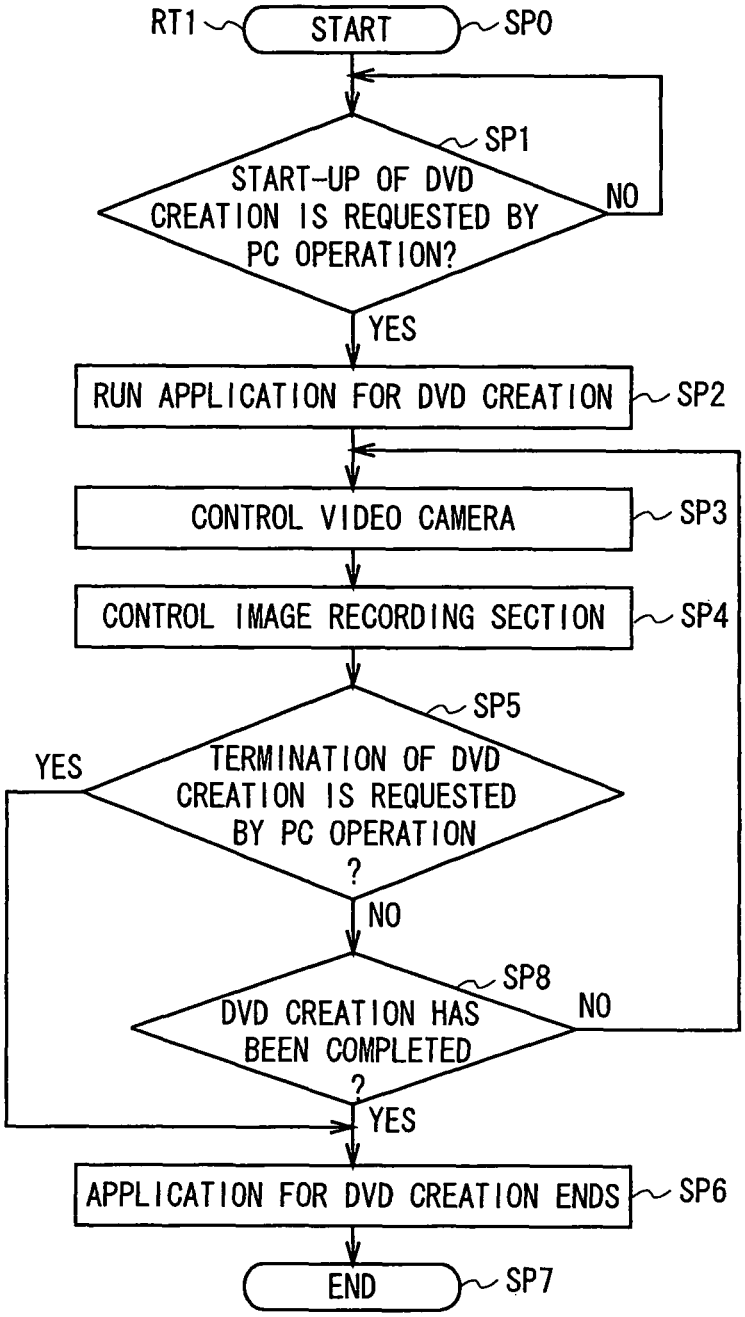


FIG. 2 (PRIOR ART)

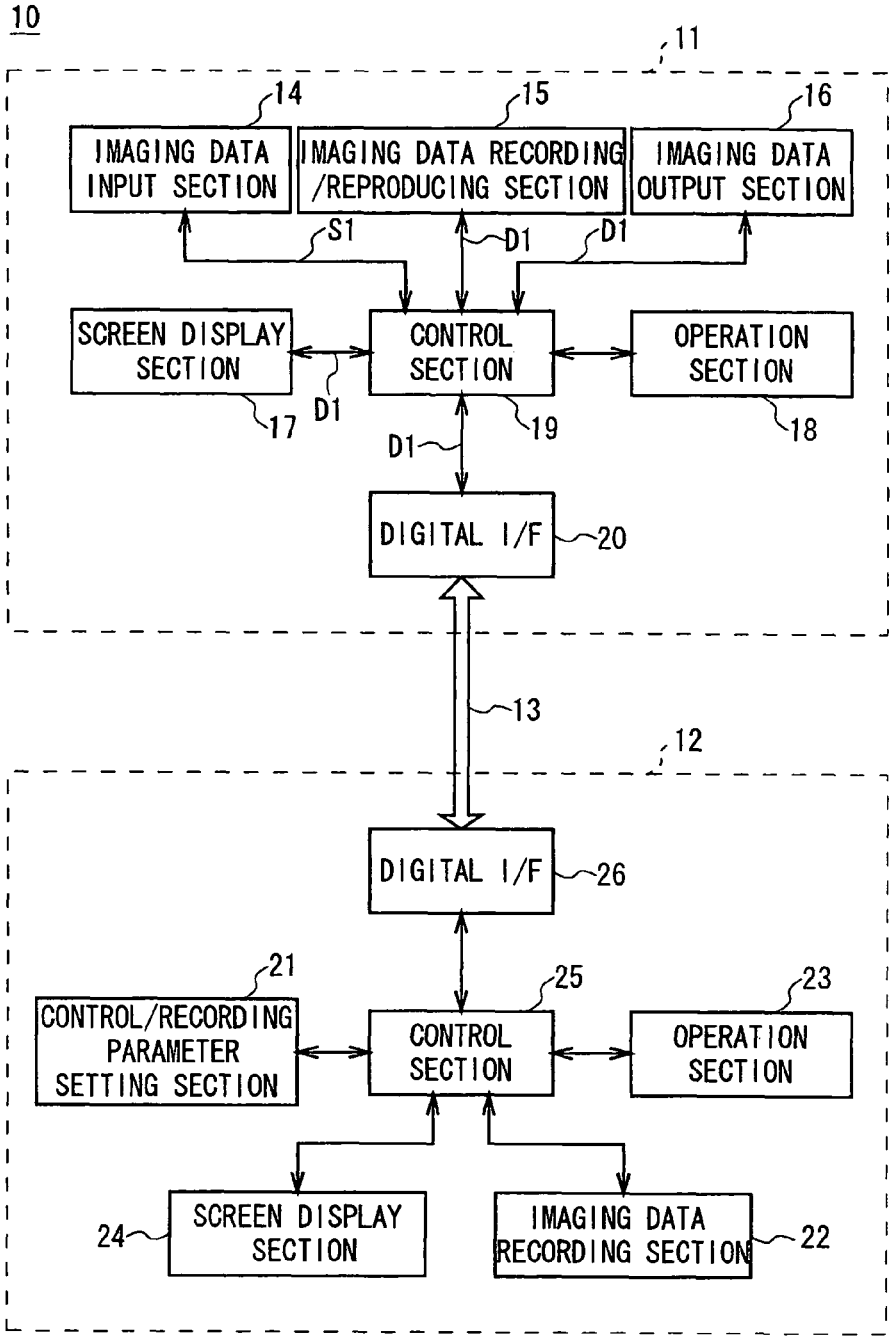

10
11
14
15
16
IMAGING DATA INPUT SECTION
IMAGING DATA RECORDING /REPRODUCING SECTION
IMAGING DATA OUTPUT SECTION
S1
D1
D1
SCREEN DISPLAY SECTION
CONTROL SECTION
OPERATION SECTION
17
D1
19
18
D1
DIGITAL I/F
20
13
12
DIGITAL I/F
26
21
25
23
CONTROL/RECORDING PARAMETER SETTING SECTION
CONTROL SECTION
OPERATION SECTION
24
SCREEN DISPLAY SECTION
IMAGING DATA RECORDING SECTION
22

FIG. 3

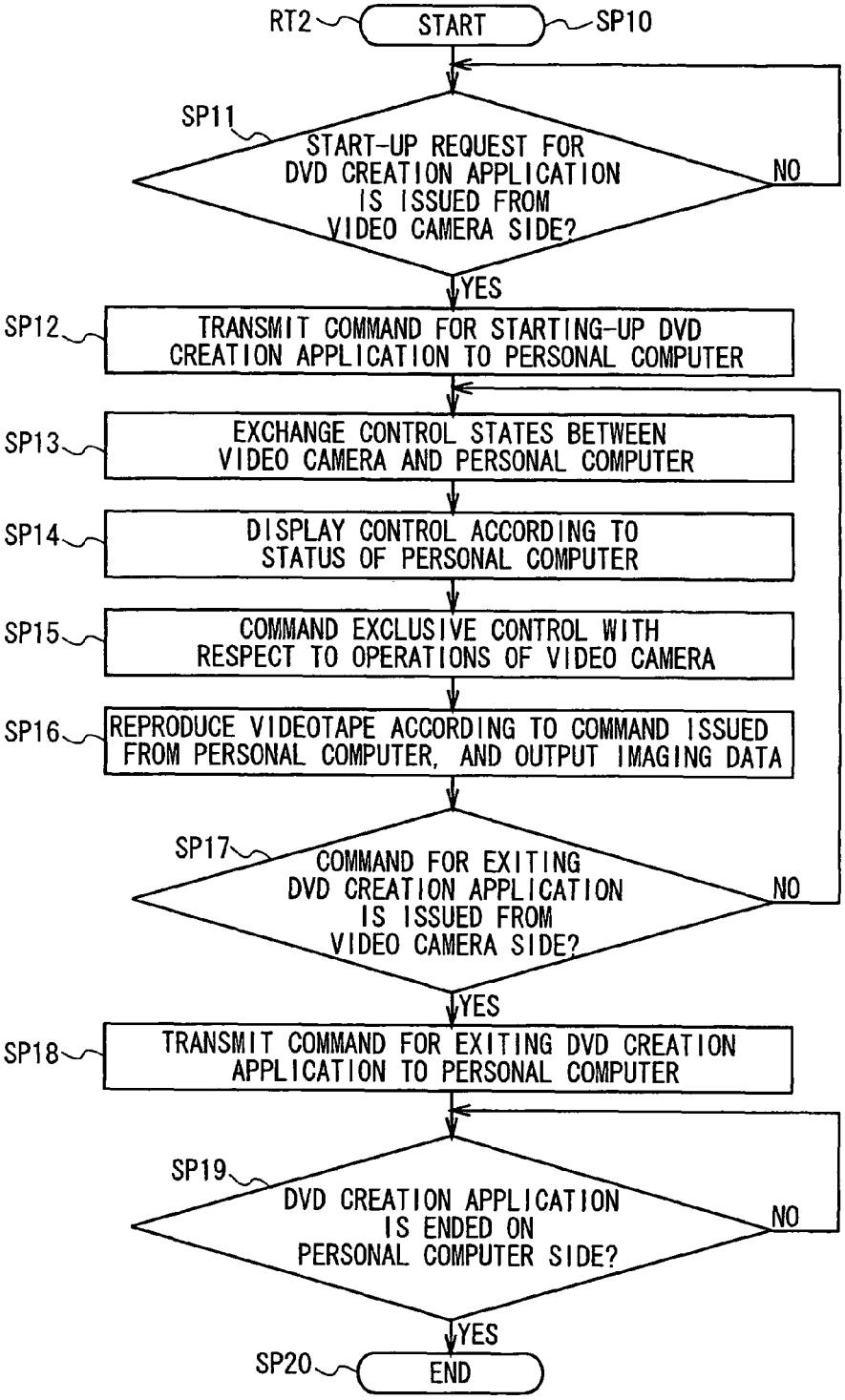

RT2
START
SP10
SP11
START-UP REQUEST FOR DVD CREATION APPLICATION IS ISSUED FROM VIDEO CAMERA SIDE?
NO
YES
SP12
TRANSMIT COMMAND FOR STARTING-UP DVD CREATION APPLICATION TO PERSONAL COMPUTER
SP13
EXCHANGE CONTROL STATES BETWEEN VIDEO CAMERA AND PERSONAL COMPUTER
SP14
DISPLAY CONTROL ACCORDING TO STATUS OF PERSONAL COMPUTER
SP15
COMMAND EXCLUSIVE CONTROL WITH RESPECT TO OPERATIONS OF VIDEO CAMERA
SP16
REPRODUCE VIDEOTAPE ACCORDING TO COMMAND ISSUED FROM PERSONAL COMPUTER, AND OUTPUT IMAGING DATA
SP17
COMMAND FOR EXITING DVD CREATION APPLICATION IS ISSUED FROM VIDEO CAMERA SIDE?
NO
YES
SP18
TRANSMIT COMMAND FOR EXITING DVD CREATION APPLICATION TO PERSONAL COMPUTER
SP19
DVD CREATION APPLICATION IS ENDED ON PERSONAL COMPUTER SIDE?
NO
YES
SP20
END

FIG. 4

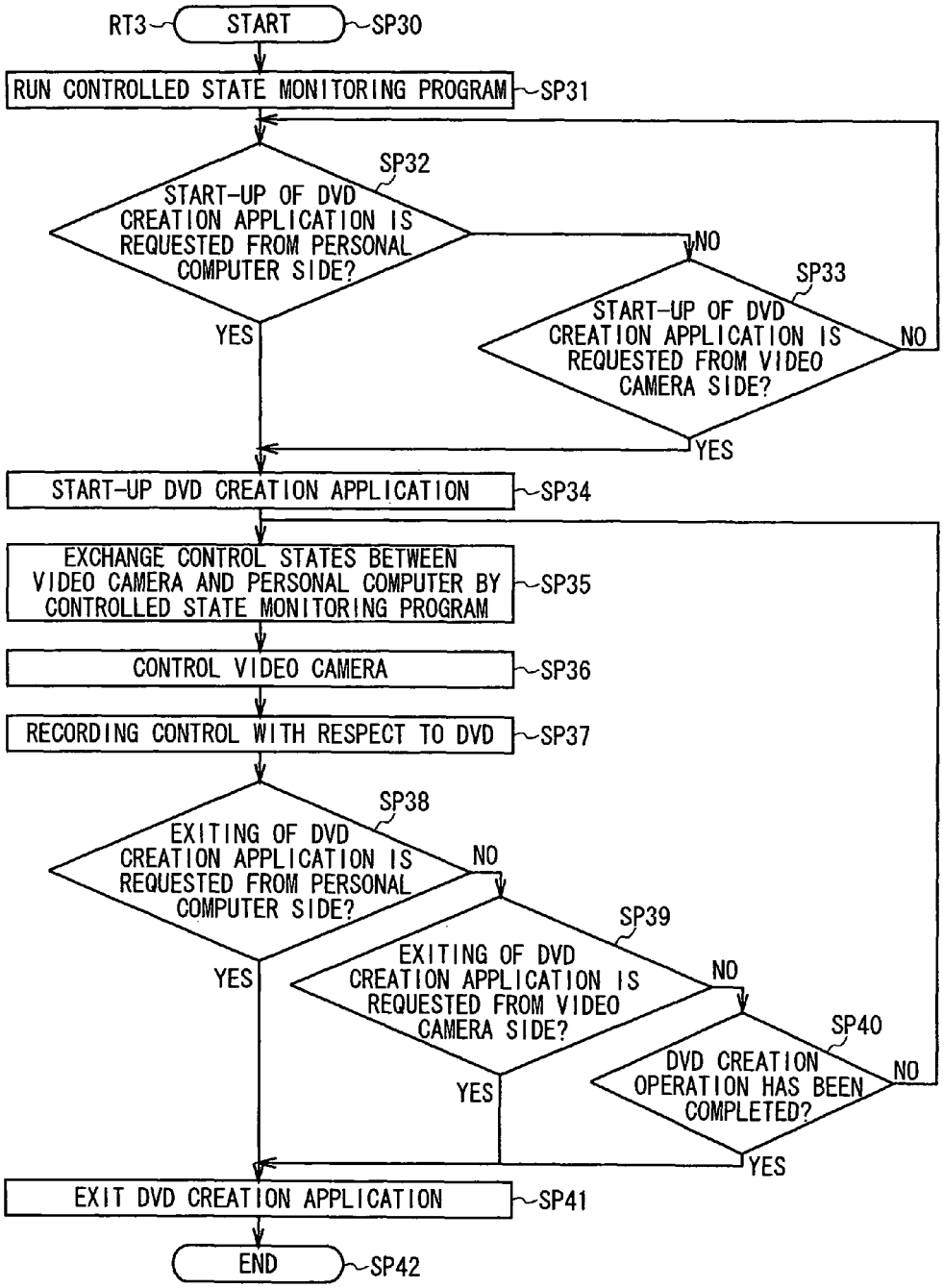

RT3
START
SP30
RUN CONTROLLED STATE MONITORING PROGRAM
SP31
SP32
START-UP OF DVD CREATION APPLICATION IS REQUESTED FROM PERSONAL COMPUTER SIDE?
NO
SP33
START-UP OF DVD CREATION APPLICATION IS REQUESTED FROM VIDEO CAMERA SIDE?
NO
YES
YES
START-UP DVD CREATION APPLICATION
SP34
EXCHANGE CONTROL STATES BETWEEN VIDEO CAMERA AND PERSONAL COMPUTER BY CONTROLLED STATE MONITORING PROGRAM
SP35
CONTROL VIDEO CAMERA
SP36
RECORDING CONTROL WITH RESPECT TO DVD
SP37
SP38
EXITING OF DVD CREATION APPLICATION IS REQUESTED FROM PERSONAL COMPUTER SIDE?
NO
SP39
EXITING OF DVD CREATION APPLICATION IS REQUESTED FROM VIDEO CAMERA SIDE?
NO
YES
SP40
DVD CREATION OPERATION HAS BEEN COMPLETED?
NO
YES
YES
EXIT DVD CREATION APPLICATION
SP41
END
SP42

FIG. 5

FIG. 6A

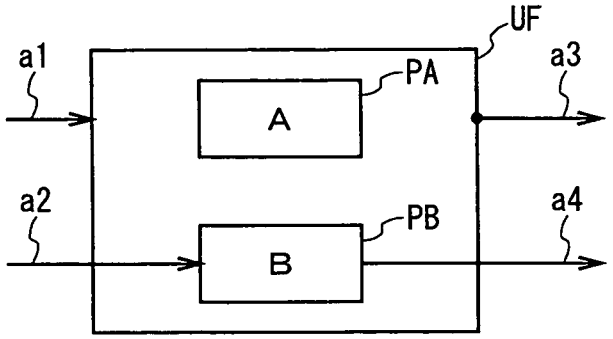
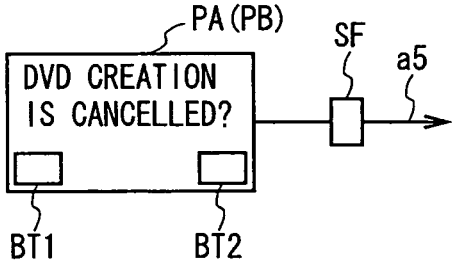

UF
a1
PA
a3
A
a2
PB
a4
B

FIG. 6B


PA (PB)
SF
a5
DVD CREATION
IS CANCELLED?
BT1
BT2

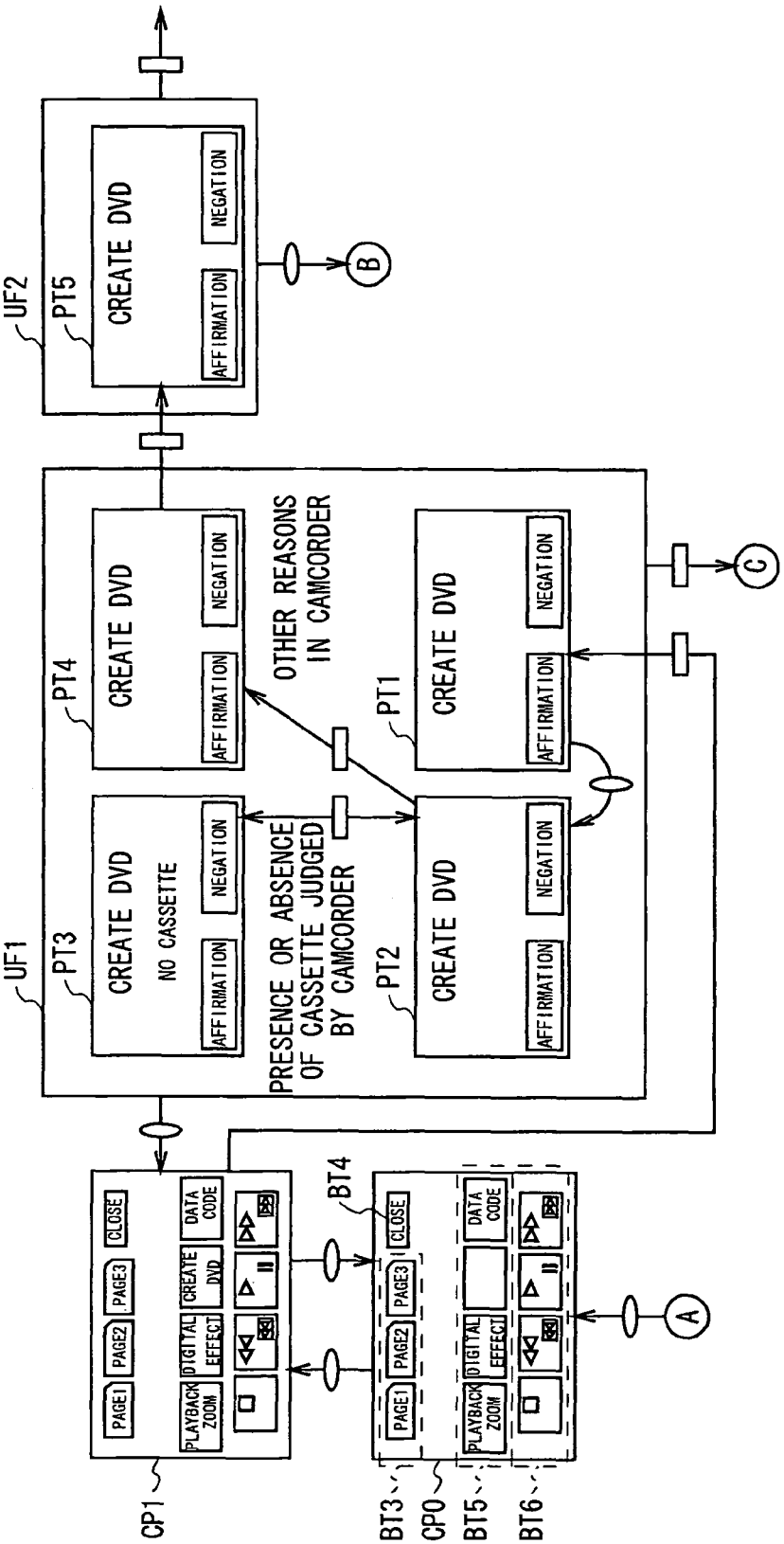

UF2
PT5
CREATE DVD
AFFIRMATION
NEGATION
B
UF1
PT4
CREATE DVD
AFFIRMATION
NEGATION
OTHER REASONS IN CAMCORDER
PT1
CREATE DVD
AFFIRMATION
NEGATION
C
PT3
CREATE DVD
NO CASSETTE
AFFIRMATION
NEGATION
PRESENCE OR ABSENCE OF CASSETTE JUDGED BY CAMCORDER
PT2
CREATE DVD
AFFIRMATION
NEGATION
BT4
PAGE1
PAGE2
PAGE3
CLOSE
PLAYBACK ZOOM
DIGITAL EFFECT
CREATE DVD
DATA CODE
A
CP1
BT3
CP0
BT5
BT6

FIG. 7

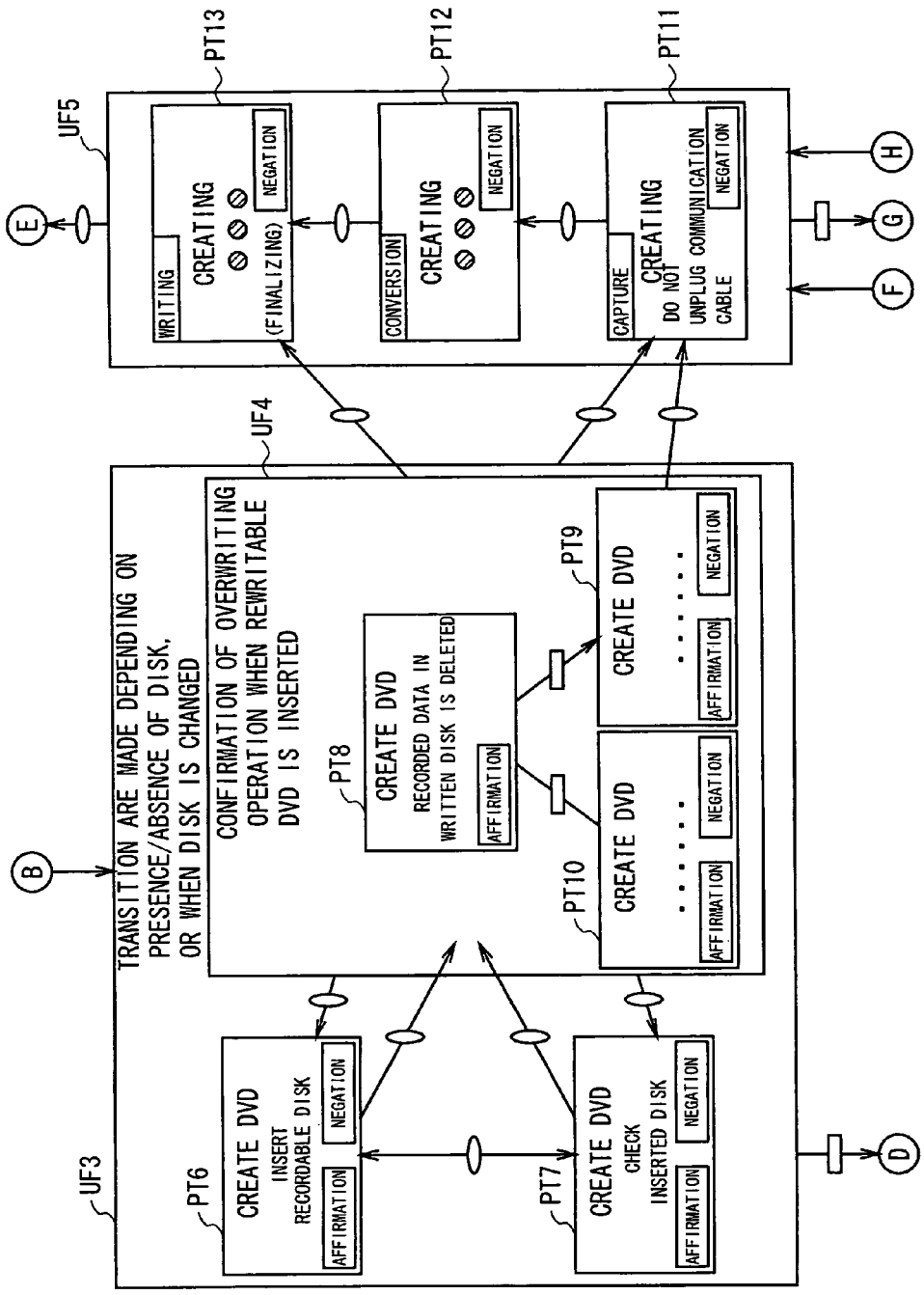

UF3
UF4
UF5
TRANSITION ARE MADE DEPENDING ON PRESENCE/ABSENCE OF DISK, OR WHEN DISK IS CHANGED
CONFIRMATION OF OVERWRITING OPERATION WHEN REWRITABLE DVD IS INSERTED
PT6
CREATE DVD
INSERT RECORDABLE DISK
AFFIRMATION
NEGATION
PT7
CREATE DVD
CHECK INSERTED DISK
AFFIRMATION
NEGATION
PT8
CREATE DVD
RECORDED DATA IN WRITTEN DISK IS DELETED
AFFIRMATION
PT9
CREATE DVD
AFFIRMATION
NEGATION
PT10
CREATE DVD
AFFIRMATION
NEGATION
PT11
CREATING
CAPTURE
DO NOT UNPLUG COMMUNICATION CABLE
NEGATION
PT12
CREATING
CONVERSION
NEGATION
PT13
CREATING
WRITING
(FINALIZING)
NEGATION
B
D
E
F
G
H

FIG. 8

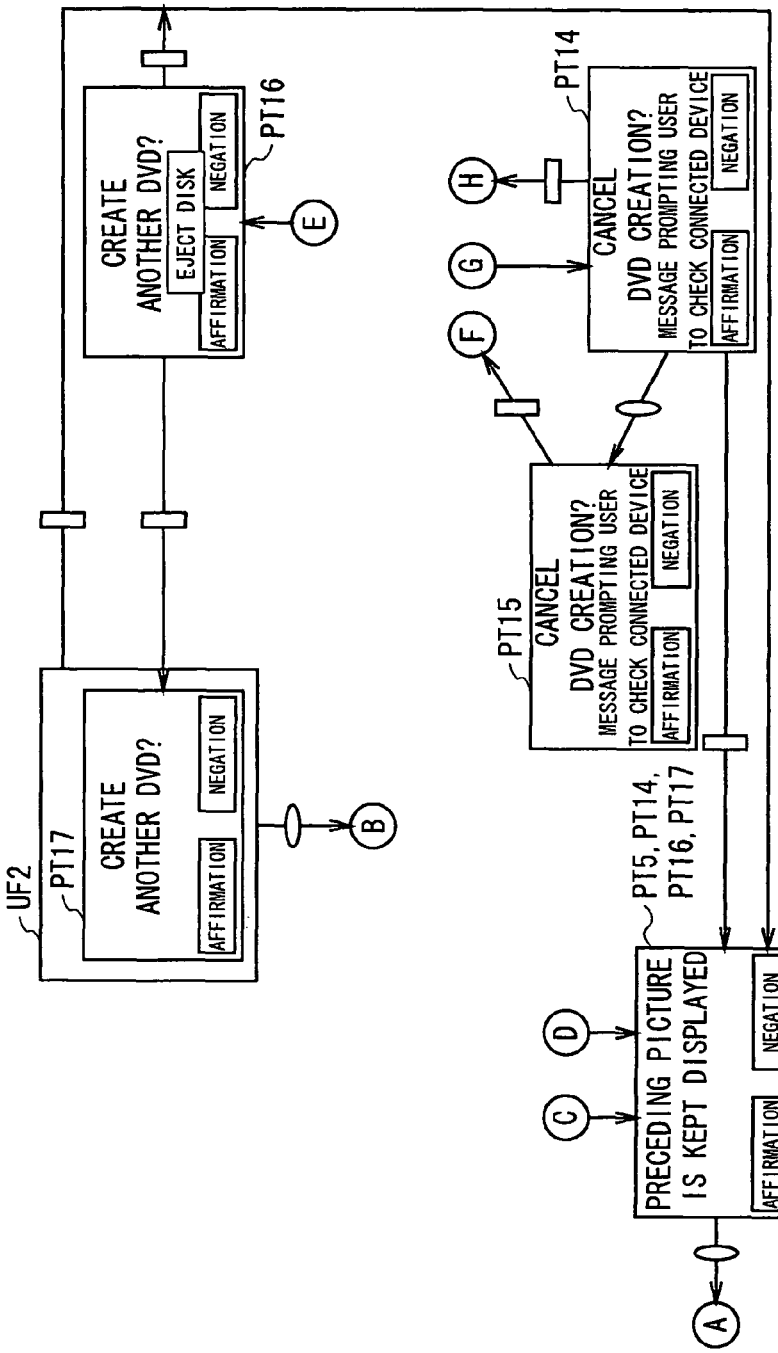

UF2
PT17
CREATE ANOTHER DVD?
AFFIRMATION
NEGATION
B
CREATE ANOTHER DVD?
EJECT DISK
AFFIRMATION
NEGATION
PT16
E
PT15
CANCEL DVD CREATION?
MESSAGE PROMPTING USER TO CHECK CONNECTED DEVICE
AFFIRMATION
NEGATION
F
PT14
CANCEL DVD CREATION?
MESSAGE PROMPTING USER TO CHECK CONNECTED DEVICE
AFFIRMATION
NEGATION
G
H
PT5, PT14, PT16, PT17
PRECEDING PICTURE IS KEPT DISPLAYED
AFFIRMATION
NEGATION
C
D
A

FIG. 9

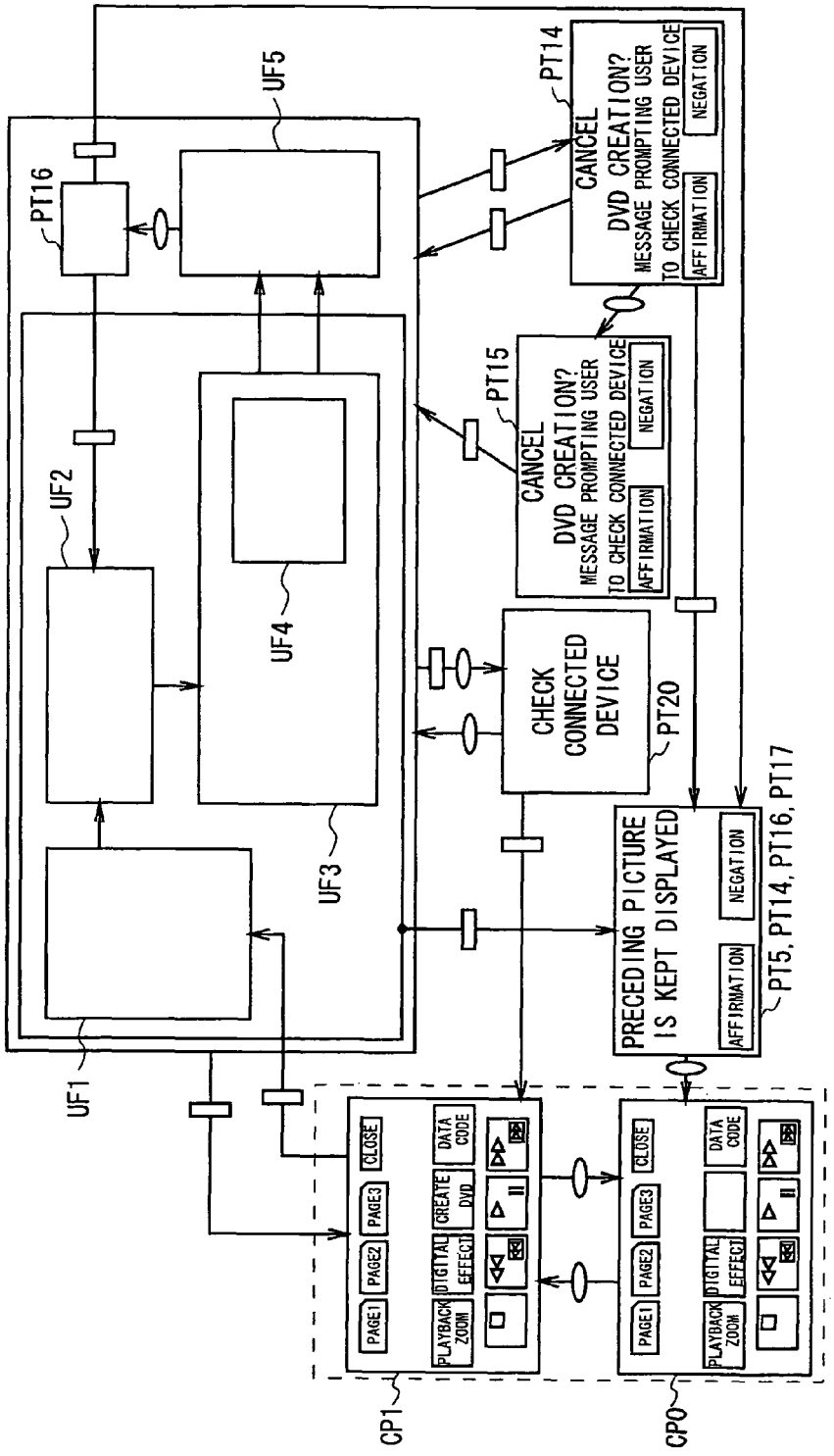

UF1
UF2
UF3
UF4
UF5
PT14
CANCEL
DVD CREATION?
MESSAGE PROMPTING USER
TO CHECK CONNECTED DEVICE
NEGATION
AFFIRMATION
PT15
CANCEL
DVD CREATION?
MESSAGE PROMPTING USER
TO CHECK CONNECTED DEVICE
NEGATION
AFFIRMATION
PT16
CHECK CONNECTED DEVICE
PT20
PRECEDING PICTURE IS KEPT DISPLAYED
NEGATION
AFFIRMATION
PT5, PT14, PT16, PT17
CLOSE
PAGE3
PAGE2
PAGE1
DATA CODE
CREATE DVD
DIGITAL EFFECT
PLAYBACK ZOOM
CP1
CP0

FIG. 10

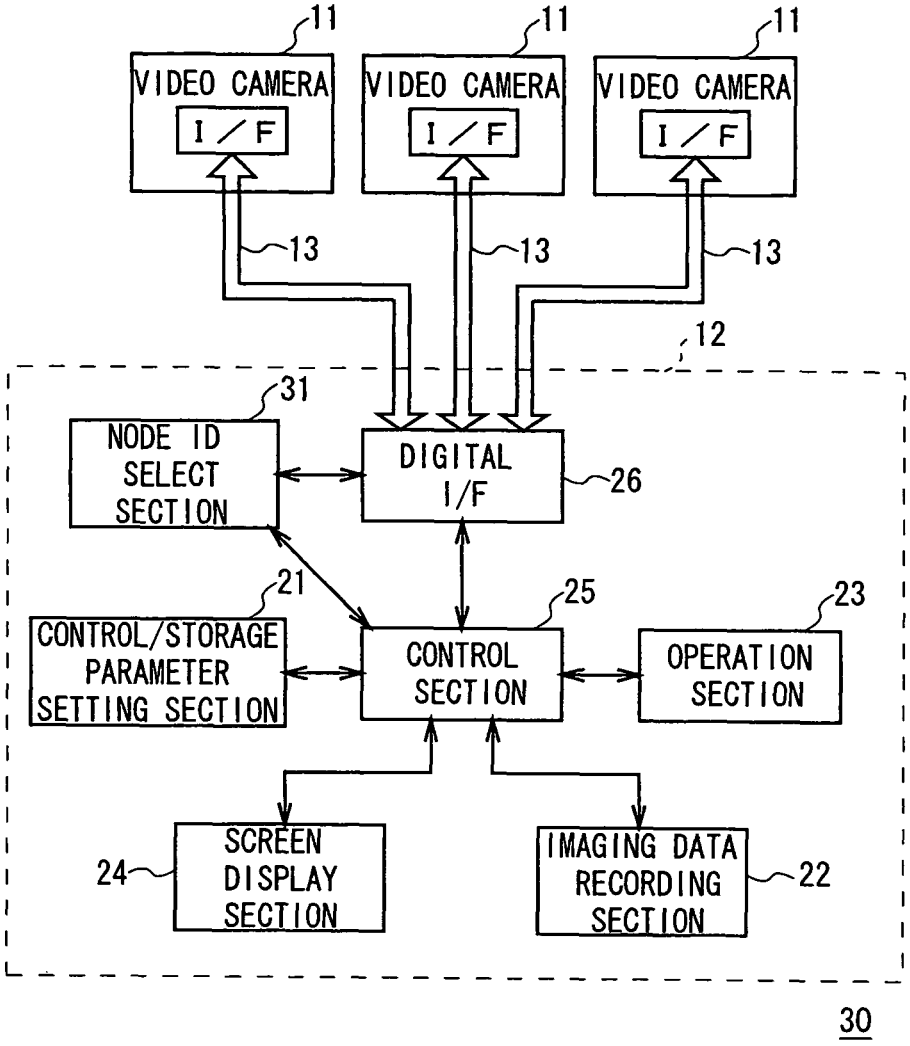

11
VIDEO CAMERA
I / F
11
VIDEO CAMERA
I / F
11
VIDEO CAMERA
I / F
13
13
13
12
31
NODE ID SELECT SECTION
DIGITAL I/F
26
21
CONTROL/STORAGE PARAMETER SETTING SECTION
25
CONTROL SECTION
23
OPERATION SECTION
24
SCREEN DISPLAY SECTION
IMAGING DATA RECORDING SECTION
22
30

FIG. 11

IMAGING DEVICE AND RECORDING CONTROL SYSTEM

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to an imaging device and recording control system, and can be suitably applied to, for example, a video camera system in which a video camera is connected to a personal computer.

2. Description of the Related Art

Recently, home video cameras and digital versatile disc (DVD) players are in widespread use, and at the same time, personal computers have become increasingly sophisticated. Under the circumstances, the number of users who transfers images obtained by means of a video camera and output-images of a DVD player to a personal computer to store these images on recording media such as an incorporated hard disk drive or an externally inserted rewritable DVD has increased.

FIG. **1** shows a video camera system **1** in which a video camera **2** and personal computer **3** are connected with each other through a communication cable **4** conforming, for example, to the Institute of Electrical and Electronics Engineers (IEEE) 1394 standard. Transferring an image of an object obtained by means of the video camera **2** to the personal computer **3** will be explained below.

The personal computer **3** starts an image copying routine RT**1** shown in FIG. **2** from step SP**0** with the video camera **2** connected thereto. Subsequently, in step SP**1**, the personal computer **3** waits for a start-up request, for a data copy operation (hereinafter referred to as DVD creation) from the video camera **2** onto a rewritable DVD, to be issued by a user's operation.

If YES in step SP**1**, the flow advances to step SP**2** and the personal computer **3** runs an application for DVD creation. Thereafter, in step SP**3**, the personal computer **3** transmits a predetermined control command to the video camera **2** through the communication cable **4** to allow the video camera **2** to transmit an imaging result to the personal computer **3** through the communication cable **4**.

Subsequently, in step SP**4**, the personal computer **3** controls an image recording section incorporated therein to record the imaging result transferred from the video camera **2** on the inserted DVD.

The personal computer **3** determines whether a termination of DVD creation is requested by user's operation in step SP**5**. If YES in step SP**5**, the flow advances to step SP**6**, and the personal computer **3** exits the application for DVD creation, and the image copying routine RT**1** ends in step SP**7**.

On the other hand, if NO in step SP**5**, the personal computer **3** determines whether the data copy operation for the DVD has already been completed or not in step SP**8**.

When the personal computer **3** determines, in step SP**8**, that the DVD creation has been completed, the flow advances to step S**7** and the image copying routine RT**1** ends. On the other hand, when the personal computer **3** determines that the DVD creation has not been completed, the flow returns to step SP**3**, and the same processes as above are repeated.

As described above, in the conventional video camera system **1**, the user operates the personal computer **3** with the video camera **2** connected to the personal computer **3**, thereby attaining the data copy operation from the video camera **2** to the personal computer **3** (refer to, for example, Japanese Patent Laid Open No. 2000-32321 (Pages 21 to 22, FIGS. 30 to 33))

However, the video camera system **1** has a disadvantage that the copy operation of the imaging result of the video camera **2** to the DVD inserted into the personal computer **3** cannot be carried out unless the personal computer **3** is operated by the user.

In practice, a user firstly operates the personal computer **3** to run a predetermined application for DVD creation, and then, the user must set a starting point of capturing the imaging data or a bit rate at the time of DVD creation according to instructions from the application in some cases, and must give instructions related to a series of operations from the start of DVD creation to the end of the application using the personal computer **3**. Therefore, it is difficult for the user who cannot fully handle the personal computer **3** to carry out the operation.

Further, after the personal computer **3** has been started up, control of the video camera **2** is conducted at the initiative of the personal computer **3**. Accordingly, it is impossible to operate the application provided with the personal computer **3** and confirm the progress of the application respectively from the video camera **2**. It follows that when the user visually confirms the progress of the data copy operation with attention only to the video camera **2**, it is impossible to know which operation is in progress, for example, whether the imaging data is being captured or the imaging data is being recorded on the DVD. In this case, erroneous operations may occur. For example, the user may unplug the communication cable **4** conforming to IEEE 1394 standard to cancel the DVD creation, manipulate an operation panel on the video camera **2** when the capturing is in progress to stop tape running, or eject the videotape at capturing time.

SUMMARY OF THE INVENTION

In view of the foregoing, an object of this invention is to provide an imaging device and recording control system in which the user's usability can be improved dramatically.

To solve the above problems, an imaging device according to the present invention configured to output imaging data that is obtained by imaging of an object comprises a control means for recognizing a controlled state of an external recording device when a communication is enabled with the recording device through a communication means conforming to a predetermined transmission method and an input means for allowing the recording device to execute an application needed for a recording operation obtained by controlling the recording device, and the recording device is configured to record the imaging data obtained through the communication means when the application executed by means of the input means.

As a result, a user can run the application provided with the recording device and needed for a recording operation by using only the input means of the imaging device, thereby copying the imaging data obtained as the imaging result of the imaging device to the recording device.

Further, in a recording control system according to the present invention in which an imaging device configured to output imaging data that is obtained by imaging of an object can communicate with a recording device through a communication means conforming to a predetermined transmission method, the imaging device comprises a first control means for recognizing a controlled state of the recording device and an input means for allowing the recording device to execute an application needed for a recording operation obtained by controlling the recording device, and the recording device comprises a second control means for recognizing a controlled state of the imaging device and a recording means for recording the imaging data obtained from the imaging device

through the communication means based on the application executed by means of the input means under control of the recording device.

As a result, in the recording control system, the user can run the application provided with the recording device and needed for a recording operation by using only the input means of the imaging device, thereby copying the imaging data obtained as the imaging result of the imaging device to the recording device.

The nature, principle and utility of the invention will become more apparent from the following detailed description when read in conjunction with the accompanying drawings in which like parts are designated by like reference numerals or characters.

BRIEF DESCRIPTION OF THE DRAWINGS

In the accompanying drawings:

FIG. **1** is a block diagram showing a configuration of the video camera system according to the conventional embodiment;

FIG. **2** is a flowchart to help explain the conventional image copying routine;

FIG. **3** is a block diagram showing a configuration of the video camera system according to an embodiment;

FIG. **4** is a flowchart to help explain the routine of "Set It And Leave It" feature for DVD creation on the video camera side;

FIG. **5** is a flowchart to help explain the routine of "Set It And Leave It" feature for DVD creation on the personal computer side;

FIGS. **6**A and **6**B are schematic diagrams for preliminary explanation of state transition diagram;

FIG. **7** is a schematic diagram to help explain the normal state transition diagram;

FIG. **8** is a schematic diagram to help explain the normal state transition diagram;

FIG. **9** is a schematic diagram to help explain the normal state transition diagram;

FIG. **10** is a schematic diagram to help explain the state transition diagram including exception/suspension process;

FIG. **11** is a block diagram showing a configuration of the video camera system according to another embodiment; and

FIG. **12** is a block diagram showing a configuration of the video camera system according to another embodiment.

DETAILED DESCRIPTION OF THE EMBODIMENT

Preferred embodiments of this invention will be described with reference to the accompanying drawings:

(1) Entire Configuration of Video Camera System According to Present Embodiment

In FIG. **3**, reference numeral **10** denotes a video camera system according to the present embodiment. In the video system **10**, a video camera **11** and personal computer **12** are connected to each other through a communication cable **13** conforming to, for example, IEEE 1394 standard.

The video camera **11** is configured to perform various operations under control of a control section **19**, to which an imaging data input section **14**, imaging data recording/reproducing section **15**, imaging data output section **16**, screen display section **17** and operation section **18** are connected.

At the time of shooting an object, the imaging data input section **14** photoelectrically converts an imaging light incident through a projection lens on an imaging surface of a charge coupled device (CCD) to obtain an image signal, and then subjects the image signal to correlated double sampling and auto gain control (AGC) processing to decrease noise components and prevent contrast from fluctuating, followed by digital conversion.

The imaging data input section **14** then subjects the digitized image signal to Y/C separation, white balance adjustment, and γ (gamma)-correction, converts the resultant signal to a video signal S**1** by matrix processing, and transmits it to the control section **19**.

When the shooting is in progress, the control section **19** sequentially writes the video signal S**1** into a random access memory (RAM) (not shown) in units of frame. At the same time, the control section **19** converts the video signal S**1** to an imaging data D**1** composed of composite signals conforming to a predetermined method such as the National Television System Committee (NTSC) by an encoder (not shown), and transmits the imaging data D**1** to the imaging data recording/reproducing section **15**, imaging dada output section **16**, and screen display section **17**.

When instructed to, for example, perform a zoom processing based on the user's operation on the operation section **18**, the control section **19** enlarges/reduces the video signal S**1** at a specified scale factor in frame. Thereafter the control section **19** sequentially writes the resultant enlarged or reduced image into the RAM and allows the screen display section **17** to display in real time moving images based on the imaging data D**1** (hereinafter referred to as finder image) through the encoder.

The imaging data recording/reproducing section **15** includes a tape inserting portion (not shown) into which the videotape can be inserted. Upon receiving a transmission signal generated in response to the user's insertion/ejection of the videotape, the imaging data recording/reproducing section **15** transmits the signal to the control section **19**, and records the finder images generated based on the imaging data D**1** transmitted from the control section **19** to the videotape.

The imaging data output section **16** includes a speaker, analog ports and the like and is configured to output, as desired, a sound, video picture or the like generated based on the imaging data D**1** transmitted from the control section **19**. The operation section **18** includes various kinds of keys, switches and the like provided in the video camera **11**. When a remote commander (not shown) is included, the operation section **18** also includes a receiving section of the remote commander.

The video camera **11** also includes a digital interface (I/F) **20** in order for the control section **19** to communicate with the personal computer **12** through the communication cable **13**, thereby sending/receiving various types of data and commands to/from the personal computer **12**.

Further, in the present embodiment, the control section **19** is configured to receive a controlled state (hereinafter referred to as "status") of the personal computer **12** at regular time intervals, and to transmit a start-up or termination request for the DVD creation application caused by the user's operation on the video camera **11**, or the status displayed on the video camera **11**.

The personal computer **12** is configured to perform various operations under control of a control section **25**, to which a control/recording parameter setting section **21**, imaging data recording section **22**, operation section **23**, and screen display section **24** are connected.

The personal computer **12** also includes a digital interface (I/F) **26** in order for the control section **25** to communicate

with the video camera **11** through the communication cable **13**, thereby sending/receiving various types of data and commands to/from the video camera **11**.

The control/recording parameter setting section **21** includes a read only memory (ROM) in which various kinds of software applications are stored, a RAM which acts as a working memory of the control section **25**, and a hard disk drive in which the various types of data is stored, thereby configured to set mainly a control parameter of the video camera **11** or recording parameter for recording operations to the DVD.

The imaging data recording section **22** includes a disk inserting portion (not shown) into which the DVD can be inserted. The imaging data recording section **22** transmits a transmission signal generated in response to the user's insertion/ejection of the DVD, and records video pictures generated based on the imaging data D**1** output from the video camera **11** on the DVD. Note that rewritable DVDs such as a DVD-RAM or DVD-RW (Rewritable), or only recordable DVDs such as a DVD-R (Recordable) are used as a DVD for data recording.

The control section **25** performs various processing based on the imaging data D**1** and the command received from the video camera **11** through the communication cable **13** and digital interface, and the software applications stored in the ROM included in the control/recording parameter setting section **21**.

Further, in the present embodiment, the control section **25** is configured to transmit the progress of the DVD creation application (that is, a status of the personal computer **12**) to the video camera **11** at regular time intervals, and to receive a status of the video camera **11**.

(2) "Set it and Leave it" Feature for DVD Creation

In the video camera system **10** according to the present embodiment, it is only necessary for the user to operate the video camera **11** to carry out the data copy operation (hereinafter referred to as "Set It And Leave It" feature for DVD creation). That is, by just connecting the video camera **11** to the personal computer **12** through the communication cable **13** and operating only the video camera **11**, the imaging data D**1** obtained as the imaging result of the video camera **11** can be copied to the DVD inserted into the personal computer **12**.

To realize "Set It And Leave It" feature for DVD creation, controlled state monitoring programs are previously installed on the control sections **19**, **25** of the video camera **11** and personal computer **12**, respectively. With the programs, each of the control sections **19** and **25** carry out various processes corresponding to commands or responses exchanged with each other alternately. In addition, the DVD creation application is previously installed in the control section **25** of the personal computer **12**. With this application started-up, a recording can be carried out with respect to the recordable DVD inserted into the imaging data recording section **22**.

More specifically, a sequence of operations for carrying out "Set It And Leave It" feature for DVD creation is as follows. First, with the personal computer **12** and the video camera **11** connected to each other through the communication cable **13**, the user inserts, into the video camera **11**, the tape whose contents are to be copied and the recordable DVD into the personal computer **12**. After switching the video camera **11** to the mode (hereinafter referred to as DVD creation mode) in which "Set It And Leave It" feature for DVD creation can be carried out, the user performs various operations corresponding to the DVD creation application on the side of the video camera **11**.

While capturing the video picture based on the imaging data D**1** from the video camera **11**, the personal computer **12** subjects the captured video picture to authoring process, followed by writing the resultant data into the DVD, thereby completing the copy operation for the DVD. On this occasion, the video camera **11** asks the user if another DVD is created or not. If the user wants to end the data copy operation, he or she takes the copied DVD out of the personal computer **12**.

(2-1) Routine of "Set it and Leave it" Feature for DVD Creation on Video Camera **11** Side

In the video camera system **10** in which the video camera **11** is connected to the personal computer **12** through the communication cable **13**, the control sections **19**, **25** of the video camera **11** and the personal computer **12** respectively carry out the routines RT**2** (FIG. **4**) and RT**3** (FIG. **5**) of "Set It And Leave It" feature for DVD creation, with the routines synchronized with each other.

As shown in FIG. **4**, in a routine RT**2** of "Set It And Leave It" feature for DVD creation on the side of the video camera **11**, the control section **19** of the video camera **11** starts the routine from step SP**10**, and thereafter, in step SP**11**, determines whether start-up of the DVD creation application is requested through the user's input on the operation section **18**.

If YES in SP**11**, the flow advances to step SP**12** and the control section **19** transmits a command for starting-up the DVD creation application to the personal computer **12**. Subsequently, in the step SP**13**, the video camera **11** and personal computer **12** check the controlled states of each other by exchanging between them the command and response according to the controlled state monitoring programs.

The control section **19** then recognizes the control state of the personal computer **12**, that is, the status of the DVD creation application, and allows the screen display section **17** to display corresponding contents in step SP**14**. This enables the user to recognize the displayed contents corresponding to the status, and at the same time, prevents the user from erroneously unplugging the communication cable **13** when the DVD creation application is running.

In this state, the control section **19** disables all the commands that are issued from the operation section **18** of the video camera **11**, except a command for exiting the DVD creation application, in step SP**15**. This means that most of the functions provided with the operation section **19** are forcibly disabled. As a result, it is possible to prevent the user from performing erroneous operations such as canceling of a playback of a videotape when the DVD application is running.

Subsequently, in step SP**16**, the control section **19** reproduces the imaging data D**1** recorded in the videotape according to a control command issued from the personal computer **12**, and simultaneously transmits the data D**1** to the personal computer **12** through the communication cable **13**.

The control section **19** then determines, in step SP**17**, whether the command for exiting the DVD creation application is issued through the user's input on the operation section **18**. If YES, the flow advances to step SP**18** and the control section **19** transmits the command for exiting the DVD creation application to the personal computer **12** through the communication cable **13**.

Thereafter, the control section **19** determines, in step SP**19**, whether the DVD creation application has exited. If YES, that is, only when the corresponding response is issued from the personal computer **12**, the flow advances to step SP**20** and the routine RT**2** of "Set It And Leave It" feature for DVD creation ends.

On the other hand, if NO in step SP**17**, the control section **19** determines that the input on the operation section **18** is not

performed by the user. Then the flow returns to step SP13 and the same processes as those described above are repeated.

As described above, on the video camera 11 side, with a series of processes from start-up of the DVD creation application to end thereof displayed on the screen display section 17, the user operates only the operation section 18 of the video camera 11, thereby copying the imaging data D1 obtained as the imaging result from the video camera 11 to the DVD inserted into the personal computer 12.

(2-2) Routine of "Set it and Leave it" Feature for DVD Creation on Personal Computer 12 Side

As shown in FIG. 5, in a routine RT3 of "Set It And Leave It" feature for DVD creation on the side of the personal computer 12, the control section 25 of the personal computer 12 starts the routine from step SP30, and thereafter, in step SP31, runs the previously installed controlled state monitoring program (which is configured to stay resident in memory by default), and determines, in step SP32, whether start-up of the DVD creation application is requested through the user's input on the operation section 23.

If NO in step SP32, the flow advances to step SP33, and the control section 25 determines whether start-up of the DVD creation application is requested through the user's operation on the side of the video camera 11. If NO in this step SP33 again, the flow returns to step SP32.

As described above, in steps SP32 and SP33, the control section 25 determines whether start-up of the DVD creation application is requested through the user's operation on the video camera 11 side or personal computer 12 side. If YES in SP32 or SP33, the flow advances to step SP34.

In the step SP34, the control section 25 starts-up the DVD creation application. Thereafter the flow advances to step SP35, and the personal computer 12 and the video camera 11 check the controlled states of each other by exchanging between them the commands and responses according to the controlled state monitoring programs.

In step SP36, the control section 25 transmits a control command to the video camera 11 to allow the video camera 11 to reproduce the imaging data D1 recorded in the videotape, and to transmit the data D1 to the personal computer 12 through the communication cable 13.

The control section 25 then controls the imaging data recording section 22 to record the imaging data D1 transmitted from the video camera 11 through the communication cable 13 on the inserted DVD, in step SP37.

The flow advances to step SP38, and the control section 25 determines whether the command for exiting the DVD creation application is input through the user's operation on the operation section 23. If NO in this step SP38, the flow advances to step SP39, and the control section 25 determines whether the command for exiting the DVD creation application is input through the user's operation on the side of the video camera 11. If NO in this step SP39 again, the flow advances to step SP40 and the control section 25 determines whether the DVD creation operation, that is, recording operation for the DVD has been completed.

If NO in step SP40, the control section 25 determines that instructions to end the DVD creation are not issued from both sides of the personal computer 12 and video camera 11, and that the DVD creation has not been completed. Then the flow returns to step SP35 and the same processes as those described above are repeated.

In the steps SP38 to SP40, the control section 25 determines whether the DVD creation application has been commanded to exit by the user's operation on the personal computer 12 side or video camera 11 side, or whether the DVD creation has been completed. If YES in any of Steps SP38 to SP40, the flow advances to step SP41.

The control section 25 exits the DVD creation application in step SP41, and the routine RT3 of "Set It And Leave It" feature for DVD creation ends in step SP42.

As described above, in the personal computer 12 connected to the video camera 11, the imaging data D1 transmitted from the video camera 11 can be copied to the DVD, with a series of processes from start-up of the DVD creation application to end thereof executed responding to the user's operation from the video camera 11.

(2-3) Screen Transition State on Video Camera 11 Side

"Set It And Leave It" feature for DVD creation can be carried out with a display screen of the screen display section 17 on the video camera 11 side visually confirmed by the user. With the statuses exchanged between the video camera 11 and personal computer 12, the display screen for "Set It And Leave It" feature for DVD creation is sequentially displayed as a transition picture according to the statuses. More specifically, the display screen for "Set It And Leave It" feature for DVD creation is displayed as the following state transition diagrams ST1 shown in FIG. 7 and FIG. 8, respectively.

As shown in FIG. 6A, in the state transition diagrams ST1, each of a plurality of state transition pictures such as PA and PB representing a specific status in "Set It And Leave It" feature for DVD creation is viewed in such a manner to be surrounded by a predetermined square-shaped line (hereinafter referred to as upper frame) UF.

An arrow a1 pointing the upper frame UF represents that a current transition picture switches to either the transition picture PA or transition picture PB included in the upper frame UF. An arrow a2 entering the upper frame UF and pointing a closing line of a specific transition picture PB represents that a current transition picture switches to the transition picture PB.

An arrow a3 starting from a closing line of the upper frame UF represents a transition generated from either the transition pictures PA or PB included in the upper frame UF, and an arrow a4 starting from a closing line of the specific transition picture PB, and going out of the upper frame UF represents a transition generated only from the transition picture PB.

As shown in FIG. 6B, in the transition picture PA (PB), a message (for example, "DVD creation is cancelled?") displayed on the central and upper portion of the picture represents the state of the video camera 11. In addition, a button (hereinafter referred to as affirmative action button) BT1 such as DECISION, EXECUTION or OK is displayed in graphical user interface (GUI) mode on the lower left side of the picture, and a button (hereinafter referred to as negative action button) BT2 such as WITHDRAWAL or CANCEL is displayed in GUI mode on the lower right side of the picture.

A square frame SF on an arrow a5 starting from a closing line of the transition picture PA (PB) represents a trigger corresponding to each transition condition or a physical factor such as connect and disconnect, and an ellipse (not shown) on the arrow a5 represents a status change in the personal computer 12.

Fundamental conditions under which one state switches to another in the state transition diagrams ST1 shown in FIG. 7 and FIG. 8 will be described. First, the condition for the video camera 11 to enter a DVD creation mode is that a videotape must be inserted and no errors must be allowed to occur, that is, the videotape can be reproduced, and that mutual recognition with the DVD creation application of the personal computer 12 has been established through the communication cable 13.

Secondly, the condition for the video camera **11** to step out the DVD creation mode is that, in the case of involving a forced termination, the DVD creation operation has been completed normally or that DVD creation operation has been canceled, and in the case of not involving the forced termination, the communication with the personal computer **12** is disabled when the communication cable **13** is unplugged, the video camera **11** is turned off, or different kinds of factors (freeze or error in operating system (OS) or application) occur.

Thirdly, in the DVD creation mode, the video camera **11** itself does not make a judgment on whether the state transition shifts normally or not, but the state transition essentially shifts based on a status of the personal computer **12** as a priority. Fourthly, the DVD creation application is not automatically exited on the personal computer **12** side without being requested to exit by the video camera **11**. This means that, for example, the user can instruct the application to create another DVD by mouse action or the like, and that the opportunity for the DVD creation operation to return to its original state when the normally operating video camera **11** is recognized again by the personal computer **12**. Fifthly, in the personal computer **12**, a disk (DVD) is not automatically ejected except immediately after the message "Create another DVD?" is displayed.

(2-3-1) Normal State Transition Diagram ST**1**

As shown in the state transition diagram ST**1** of FIG. **7**, in the display screen of the screen display section **17** of the video camera **11**, a predetermined console panel CP**0** is displayed with change-over buttons BT**3** displayed in GUI mode on the upper section thereof and a terminate button BT**4** also displayed in GUI mode next to the right end of the change buttons BT**3**. The change-over buttons BT**3** are each titled "Page **1**", "Page **2**" and "Page **3**". By selecting one of them, a display content is changed-over. The terminate button BT**4** is titled "Close". By selecting this, the console panel CP**0** is closed. In addition, various kinds of effect buttons BT**5** and control buttons BT**6** are horizontally arranged and displayed in GUI mode in the central section and the lower section of the console panel CP**0**, respectively.

At the step where the console panel CP**0** is displayed, the personal computer **12** is merely connected to the video camera **11** through the communication cable **13**. In this state, a command (hereinafter referred to as status command) for representing a status of the personal computer **12** is transmitted to the video camera **11** as an unknown communication target. Responding to the status command, the video camera **11** returns a command (hereinafter referred to as status response) for representing a status of the video camera **11** to the personal computer **12**.

The status response in this state recognizes that the video camera **11** is insufficiently prepared for the DVD creation operation, for example, a videotape has not been inserted, or the controlled state monitoring program which is resident in the communication target, that is, the personal computer **12** has not been set.

Accordingly, in the console panel CP**0**, an effect button titled "Create DVD" of a plurality of the effect buttons arranged in the middle section is disabled and the video camera **11** recognizes that the video camera **11** is insufficiently prepared for the DVD creation operation, for example, a videotape has not been inserted, or the controlled state monitoring program which is resident in the communication target, that is, the personal computer **12** has not been set.

After starting-up the control status monitoring program, the personal computer **12** recognizes the communication target, that is, video camera **11** as the model compatible with "Set It And Leave It" feature for DVD creation, and outputs a corresponding status command while making the DVD creation application ready to start-up. Corresponding to the status command, video camera **11** switches the console panel CP**0** to the console panel CP**1** to make the effect button titled "Create DVD" able to select.

When the effect button titled "Create DVD" is selected on the consol panel CP**1**, the screen switches to a transit picture PT**1** included in the upper frame UF**1** representing a state of waiting for start-up of the DVD creation application. A message "Create DVD" is displayed on the middle section of the transit picture PT**1**, and at the same time, an affirmative action button and negative action button are displayed in GUI mode on the lower left side, and lower right side, respectively.

At the state where the transit picture PT**1** is being displayed, the control section **19** recognizes that the video camera **11** is insufficiently prepared for the DVD creation, for example, a videotape has not been inserted or the communication target, that is, the personal computer **12** is not ready for the DVD creation. In this state, the affirmative and negative action buttons are disabled so as not to generate a trigger for DVD creation.

After having being prepared for the DVD creation, and making the DVD creation application ready to start-up, the personal computer **12** outputs a corresponding status command. Responding to the status command, the video camera **11** switches the current picture to a transition picture PT**2** included in the same upper frame UF**1**. In the transition picture PT**2**, the video camera **11** recognizes that the button for starting the DVD creation provided in the operation section **18** has been made able to select.

When a videotape has not been inserted, the current transition picture PT**2** switches to a transition picture PT**3**. On the other hand, when the state of waiting for start-up of the DVD creation application continues by other reasons, the current picture switches to a transition picture PT**4**.

When the video camera **11** becomes ready for start of the DVD creation application on the personal computer **12** side, the current transit picture switches to a transit picture PT**5** included in an upper frame UF**2** representing a DVD creation preparation waiting state.

When a disk is not inserted into the imaging data recording section **22**, or inserted disk is not blank or not rewritable, it may become impossible to continue the operation. In this case, the personal computer **12** outputs a status command to prompt insertion or change of the disk. Responding to the status command, the video camera **11** switches the current transition picture to a corresponding one of the transition pictures PT**6** or PT**7**, as shown in FIG. **8**. The transition pictures PT**6**, PT**7** are included in the upper frame UF**3** that represents a state of the disk insertion.

In addition to the transition pictures PT**6** and PT**7**, an upper frame UF**4** that represents a state of confirming an overwriting operation is set inside the upper frame UF**3** that represents a state of the disk insertion. The upper frame UF**4** includes transition pictures PT**8**, PT**9** and PT**10**.

Rewritable disk has been inserted into the personal computer **12**, and the computer **12** outputs a status command for asking the user's confirmation to delete the recorded data. Responding to the status command, the video camera **11** switches the current transition picture to the transition picture PT**8** included in the upper frame UF**4** that represents a state of confirming the overwriting operation.

In the transition picture PT**8**, a message confirming whether or not to initialize and overwrite the rewritable disk is displayed. In the next step, the transition picture PT**8** switches, depending on a user's selection, to a transition

picture PT9 that represents a request for executing the overwriting operation, or a transition picture PT10 that represents a standby state, where the overwriting operation is no longer executed.

The personal computer 12 outputs a status command representing that the imaging data D1 transmitted from the video camera 11 through the communication cable 13 is being captured into an incorporated hard disk drive. Responding to the status command, the video camera 11 switches the current transition picture PT9 that represents a request for executing the overwriting operation to a transition picture PT11 included in an upper frame UF5 that represents the progress of the data copy operation. A message for preventing the user from unplugging the communication cable 13 is displayed in the transition picture PT11.

After capturing the imaging data D1 on the hard disk drive, the personal computer 12 enters into a state of preparation for recording the imaging data D1 on the DVD, and outputs a status command representing that the data is being subjected to authoring process. Responding to the status command, the video camera 11 switches the transition picture PT11 to a transition picture PT12.

Further, after capturing the imaging data D1 on the hard disk drive, the personal computer 12 outputs a status command representing that the authorized imaging data D1 is being recoded on the DVD. Responding to the status command, the video camera 11 switches the transition picture PT12 to a transition picture PT13. Note that when a finalizing process is in progress, a corresponding message is displayed in the transition picture PT13.

If some kind of error that relates to the DVD creation operation and requires a restoration operation has occurred in the personal computer 12 when the data copy operation is underway, the personal computer 12 outputs a status command for prompting the user to check the connected device. Responding to the status command, in the video camera 11, as shown in FIG. 9, a transition is made from any of the transition pictures PT11 to PT13 included in the upper frame UF5 that represents the progress of the data copy operation to a transition picture PT14 before finalization or a transition picture PT15 after finalization. A message that asks the user to cancel the DVD creation and one that prompts the user to check the connected device are displayed respectively in the transition pictures PT14 and PT15.

When the DVD creation has been completed, the personal computer 12 outputs a status command that represents a state of inquiring whether another DVD will be created. Responding to the status command, the video/camera 11 switches the current transition picture PT13 included in the upper frame UF5 that represents the progress of the data copy operation to a transition picture PT16. A message for prompting the user to eject the disk is displayed in the transition picture PT16.

When the user selects to create another DVD on the video camera 11, the transition picture PT16 switches to a transition picture PT17 included in the above-mentioned upper frame UF2 that represents the DVD creation preparation waiting state.

When the user wants to exit the DVD creation application for reasons of the video camera 11 (termination based on a normal operation) at a time when one of the pictures including the transition pictures PT5 and PT17 that are included in the upper frame UF2, the transition picture PT16, and the transition picture PT14 is being displayed, the current picture can be switched to the console panel CP0 (FIG. 7).

(2-3-2) State Transition Diagram ST2 Including Exception/Suspension Process

The state transition diagram ST2 shown in FIG. 10 in which the same parts as those in FIGS. 7 to 9 are indicated by the same reference numerals is the same as the above state transition diagram ST1 (FIGS. 7 to 9) except that a transition picture PT20 is added.

More specifically, when some kind of error that requires restoration operation on the operation section 23 side has occurred, the personal computer 12 outputs a corresponding status command. Responding to the status command, disconnection of the communication cable 13, communication timeout or the like, the video camera 11 recognizes that a untreatable error has occurred and switches the current transition picture included in any of the upper frames UF1 to UF5 to the transition picture PT20, which prompts the user to check the connected device with a message "Check connected device" displayed.

(3) Operations and Effects of Present Embodiment

As described above, in the video camera system 10, with the controlled state monitoring programs previously set for recognizing a controlled state of each other in the video camera 11 and personal computer 12 respectively, they are connected with each other through the communication cable 13 conforming to IEEE 1394 standard. Under this configuration, a series of processes for the DVD creation application are executed from start-up to end thereof on the personal computer 12 side, based on the user's operation performed only on the video camera 11 side.

Therefore, it is sufficient for the user to operate only the video camera 11 in order to copy the imaging result, that is, imaging data D1 output from the video camera 11 to the DVD inserted into the personal computer 12. In other words, the screen display section 24 of the personal computer 12 need not be turned on.

On the video camera 11, the process of the DVD creation application is allowed to be displayed, which prevents erroneous operations of the user, such as unplugging of the communication cable in the case where the user operates only the video camera 11.

According to the above configuration, in the video camera system 10, a series of processes for the DVD creation application are executed from start-up to end thereof on the personal computer 12 side based on the user's operation performed only on the video camera 11 side, with the video camera 11 connected to the personal computer 12 through the communication cable 13, thereby carrying out the data copy operation of the imaging data D1 transmitted from the video camera 11 using the personal computer 12 without turning on the screen display section 24 of the personal computer 12. Thus, the video system 10 capable of dramatically improving the usability thereof can be realized.

(4) Another Embodiments

In the above embodiment, the configuration as shown in FIG. 3 is applied as the video camera system (recording control system) 10 in which the video camera (imaging device) 11 configured to output the imaging data D1 obtained as imaging result of the object communicates with the personal computer (recording device) through the communication cable (communication means) 13 conforming to IEEE 1394 standard (predetermined transmission method). The present invention is not limited to this, but can widely be

applied to other recording control systems including various kinds of imaging devices and recording devices.

In the above embodiment, the video camera **11** as shown in FIG. **3** having the control section (control means, first control means) **19** for recognizing a controlled state of the personal computer (recording device) **12**, the operation section (input means) **18** for allowing the personal computer (recording device) **12** to execute the DVD creation application needed for a recording operation obtained by controlling the personal computer (recording device) **12** is applied as the imaging device according to the present invention. The present invention is not limited to this, but can widely be applied to other various kinds of configurations such as an imaging device as a mobile device including, for example, a mobile phone and personal digital assistance (PDA).

In the above embodiment, the video camera (imaging device) **11** shown in FIG. **3** allows the screen display section (display means) **17** to display the progress of the DVD creation application needed for a recording operation obtained by controlling the personal computer (recording device) **12**. The present invention is not limited to this, but can widely be applied to other various kinds of display means as far as, by presenting the user with processes of the DVD creation application, they can prevent erroneous operations of the user, such as unplugging of the communication cable in the case where the user operates only the video camera **11**.

In the above embodiment, the personal computer **12** as shown in FIG. **3** having the control section (second control means) **25** for recognizing a controlled status of the video camera (imaging device) **11**, and imaging data recording section (recording means) **22** for recoding the imaging data D**1** obtained from the video camera (imaging device) **11** through the communication cable (communication means) **13** based on the execution of the DVD creation application obtained by controlling the personal computer (recording device) **12** through the operation section (input means) **18**, is applied as the recording device according to the present invention. The present invention is not limited to this, but can be applied to the personal computer **12** that an external hard disk drive is connected to, in the case where the personal computer **12** itself does not have a recording means. Further, the present invention can be also applied to optical disk recording apparatus such as a DVD recorder.

In the above embodiment, the system providing a one-to-one connection shown in FIG. **3** is applied as the video camera system (recording control system) **10** in which the video camera (imaging device) **11** which outputs the imaging data D**1** obtained as the imaging result of the object communicates with the personal computer (recording device) through the communication cable (communication means) **13** conforming to IEEE 1394 standard (predetermined transmission method). However, the present invention is not limited to this. A plurality of recording devices may be connected to a single imaging device, or a single recording device may be connected to a plurality of imaging devices.

For example, in the video camera system **30** shown in FIG. **11** in which the same parts as those in FIG. **3** are indicated by the same reference numerals, the single personal computer **12** is connected to a plurality of the video cameras **11**. In this configuration, a node ID select section **31** is added to the personal computer **12**, and each video camera **11** is connected to the digital interface **26** through the communication cable **13**.

Since the communication cable **13** conforms to IEEE 1394 standard, unique node IDs respectively assigned to devices that are connected to each other through the communication cable **13** can be used to select the target device to/from which the personal computer **12** sends and receives commands or responses from a plurality of the video cameras **11**. In practice, the node ID select section **31** of the personal computer **12** selects the previously stored node ID corresponding to the specified video camera **11** to allow the digital interface **26** not to send/receive the commands or responses issued based on the controlled state monitoring program to and from the video cameras **11** that correspond to other node IDs than the selected node ID.

As described above, in the video camera system **30**, the imaging data D**1** output only from the video camera **11** that the user selects from a plurality of video cameras **11** can be used as the target data of the data copy operation executed on the personal computer **12**. While the node ID select section **31** and control section **25** are independently provided here, the process of the node ID select section **31** may be executed by the control section **25**.

For example, in the video camera system **40** shown in FIG. **12** in which the same parts as those in FIG. **3** are indicated by the same reference numerals, a plurality of the personal computers **12** are connected to the single video camera **11**. In this configuration, a node ID select section **41** is added to the video camera. **11**, and the personal computers **12** other than the personal computers **12** connected to the video camera **11** through the communication cable **13** are connected to each other through the communication cable **42**.

Since the communication cables **13** and **42** conform to IEEE 1394 standard, unique node IDs respectively assigned to devices that are connected to each other through the communication cable **13** and **42** can be used to select the target device to/from which the video camera **11** sends and receives commands or responses from a plurality of the personal computers **12**. In practice, the node ID select section **41** of the video camera **11** selects the previously stored node ID corresponding to the specified personal computer **12** to allow the digital interface **20** not to send/receive the commands or responses issued based on the controlled state monitoring program to and from the personal computers **12** that correspond to other node IDs than the selected node ID.

As described above, in the video camera system **30**, only the personal computer **12** that the user selects from a plurality of personal computers **12** can be served as the recording device to the user. While the node ID select section **41** and the control section **19** are independently provided here, the process of the node ID select section **41** may be executed by the control section **19**.

Further, in the above embodiment, the communication cable **13** which conforms to IEEE 1394 standard is applied as a communication means according to predetermined transmission method. The present invention is not limited to this, but can widely be applied to communication means constituted by not only wired communication networks but also by wireless communication networks including, for example, a wireless LAN such as Bluetooth technology, as far as they can exchange various pieces of data with the corresponding devices. The communication means need not be provided in the imaging device, and may be connected to the outside of the imaging device as a cradle.

Further, while settings relating to a capture start point, bit rate at the time of recording data on the DVD, and the like in the "Set It And Leave It" feature for DVD creation RT**2** on the video camera **11** side shown in FIG. **4** have not been described in the above embodiment, they may be set by default values of the DVD creation application. When the settings need to be changed on the video camera **11**, the personal computer **12** must be notified of setting menu items arranged on the video camera **11** side by communication at the start of the DVD

creation application. Further, when some kind of problem has occurred on the personal computer **12** to stop the progress of the application, the video camera **11** may be notified of a cause of the problem to ask for user's response.

Furthermore, in the above embodiment, the personal computer **12** executes the DVD creation application according to the operation from the video camera **11**. The present invention is not limited to this, and when the personal computer **12** has a limited data communication resource, other application may be inhibited from using the communication resource while the communication resource is used by a specified application.

As described above, according to the present invention, an imaging device configured to output imaging data that is obtained by imaging of an object comprises a control means for recognizing a controlled state of an external recording device when a communication is enabled with the recording device through a communication means conforming to a predetermined transmission method and an input means for allowing the recording device to execute an application needed for a recording operation obtained by controlling the recording device. The recording device is configured to record the imaging data obtained through the communication means when the application is executed by means of the input means. This configuration enable the user to allow the recording device to execute the application required for the recording operation using only the input means of the imaging device, thereby copying the imaging result of the imaging device to the recording device. Thus, the imaging device capable of dramatically improving the usability thereof can be realized.

Further, according to the present invention, in a recording control system in which an imaging device configured to output imaging data that is obtained by imaging of an object can communicate with a recording device through a communication means conforming to a predetermined transmission method, the imaging device comprises a first control means for recognizing a controlled state of the recording device and an input means for allowing the recording device to execute an application needed for a recording operation obtained by controlling the recording device. The recording device comprises a second control means for recognizing a controlled state of the imaging device and a recording means for recording the imaging data obtained from the imaging device through the communication means when the application is executed by means of the input means. This configuration enable the user to allow the recording device to execute the application required for the recording operation using only the input means of the imaging device, thereby copying the imaging result of the imaging device to the recording device. Thus, the recording control system capable of dramatically improving the usability thereof can be realized.

While there has been described in connection with the preferred embodiments of the invention, it will be obvious to those skilled in the art that various changes and modifications may be aimed, therefore, to cover in the appended claims all such changes and modifications as fall within the true spirit and scope of the invention.

What is claimed is:

1. An imaging device configured to output imaging data that is obtained by imaging an object, the imaging device comprising:

a recording unit configured to record the imaging data on a recording medium;

a communication unit configured to communicate with an external recording device; and

a control unit configured to recognize a controlled state of the external recording device when a communication is enabled with the external recording device through the communication unit conforming to a predetermined transmission method,

wherein the control unit is configured to transmit a start-up request for launching a previously installed recording application to the external recording device, in which by the launching of the previously installed recording application automatically in response to the start-up request for the launching of the application the imaging device is controlled by the external recording device, by a control command transmitted from the external recording device to the imaging device automatically in response to the start-up request for the launching of the application, to transmit the imaging data to the external recording device through the communication unit for recording of the imaging data at the external recording device,

wherein the external recording device is configured to record the imaging data obtained through the communication unit based on the previously installed recording application executed.

2. The imaging device according to claim **1**, further comprising a display unit configured to display the progress of an application needed for a recording operation obtained by controlling the external recording device.

3. The imaging device according to claim **1**, wherein, when communications are enabled with a plurality of external recording devices through the communication unit connected respectively to the external recording devices, the control unit selects a specific external recording device as a communication target on the basis of unique node IDs assigned respectively to the communication unit, and refuses to communicate with the other external recording devices.

4. A recording control system in which an imaging device configured to output imaging data that is obtained by imaging an object can communicate with an external recording device through communication unit conforming to a predetermined transmission method,

wherein the imaging device comprises:

a recording unit configured to record the imaging data on a recording medium;

a communication unit configured to communicate with the external recording device;

a first control unit configured to recognize a controlled state of the external recording device,

wherein the first control unit is configured to transmit a start-up request for launching a previously installed recording application to the external recording device, in which by the launching of the previously installed recording application automatically in response to the start-up request for the launching of the application the imaging device is controlled by the external recording device, by a control command transmitted from the external recording device to the imaging device automatically in response to the start-up request for the launching of the application, to transmit the imaging data to the external recording device through the communication unit for recording of the imaging data at the external recording device; and

wherein the external recording device comprises:

a second control unit configured to recognize a controlled state of the imaging device, and

a recording unit configured to record the imaging data obtained from the imaging device through the commu-

nication unit based on the previously installed recording application executed under control of the first control unit.

5. The recording control system according to claim 4, wherein the imaging device comprises a display unit configured to displaying progress of an application needed for a recording operation obtained by controlling the external recording device.

6. The recording control system according to claim 4, wherein when communications are enabled with a plurality of external recording devices through the communication unit connected respectively to the external recording devices, the first control unit of the imaging device selects a specific external recording device as a communication target on the basis of unique node IDs assigned respectively to the communication unit, and refuses to communicate with the other external recording devices.

7. The recording control system according to claim 4, wherein, when communications are enabled with a plurality of imaging devices through the communication unit connected respectively to the imaging devices, the second control unit of the external recording device selects a specific imaging device as a communication target on the basis of unique node IDs assigned respectively to the communication unit, and refuses to communicate with the other imaging devices.

8. An imaging method for outputting imaging data that is obtained by an imaging device imaging an object, the method comprising:

a recording step for recording the imaging data on a recording medium;

a control step of recognizing a controlled state of an external recording device when a communication is enabled with the external recording device through a communication unit conforming to a predetermined transmission method; and

a transmitting step for transmitting a start-up request for launching a previously installed recording application, in which by the launching of the previously installed recording application automatically in response to the start-up request for the launching of the application the imaging device is controlled by the external recording device, by a control command transmitted from the external recording device to the imaging device automatically in response to the start-up request for the launching of the application, to transmit the imaging data to the external recording device through the communication unit for recording of the imaging data at the external recording device, and

wherein the external recording device is configured to record the imaging data obtained through the communication unit based on the previously installed recording application executed.

9. The imaging device according to claim 1, wherein the communication unit is connected outside of the imaging device.

10. The recording control system according to claim 4, wherein the communication unit is connected outside of the imaging device.

11. The imaging method according to claim 8, wherein the communication is performed outside of the imaging device.

12. The imaging device according to claim 1, wherein the imaging device is selected as a target device from among a plurality of such imaging devices using a previously stored node ID corresponding to a specified target device to/from which the external recording device sends and receives commands or responses.

13. The imaging device according to claim 1, further comprising: an operation unit configured to receive user inputs and to issue commands based on the user inputs, wherein while the recording application is being executed, the control unit is configured to disable the operation unit from issuing any command except for a command for exiting the recording application.

14. The recording control system according to claim 4, wherein the external recording device includes: a node ID selecting unit configured to select a target device from among a plurality of such imaging devices using a previously stored node ID corresponding to a specified target device to/from which the external recording device sends and receives commands or responses.

15. The recording control system according to claim 4, wherein the imaging device includes: an operation unit configured to receive user inputs and to issue commands based on the user inputs, wherein while the recording application is being executed, the control unit is configured to disable the operation unit from issuing any command except for a command for exiting the recording application.

16. The imaging method according to claim 8, further comprising: a node ID selecting step for selecting a target device from among a plurality of such imaging devices using a previously stored node ID corresponding to a specified target device to/from which the external recording device sends and receives commands or responses.

17. The imaging method according to claim 8, further comprising: an operation step for receiving user inputs and for issuing commands based on the user inputs, wherein while the recording application is being executed, the control step is configured to disable the operation step from issuing any command except for a command for exiting the recording application.

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